

KLAMATH PROJECT 2003 OPERATIONS PLAN APRIL 10, 2003

INTRODUCTION

This is the 2003 Operations Plan (Plan) for the Bureau of Reclamation's (Reclamation) Klamath Project (Project), which is located within the upper Klamath River Basin in southern Oregon and northern California. This Plan describes Project operations from April 1, 2003 through March 31, 2004 based upon current and expected hydrologic conditions and consistent with the biological opinions¹ issued by the U.S. Fish and Wildlife Service (Service) and National Oceanic and Atmospheric Administration (NOAA) Fisheries (formerly the National Marine Fisheries Service). The Plan is initially derived from the April 1, 2003 Natural Resource Conservation Service (NRCS) inflow forecast (which is not available until on or after April 10). Reclamation developed this Plan to serve as a planning aid for agricultural water users, Klamath Basin Tribes, national wildlife refuges and other interested parties. A planning process for multi-year operations of Project through 2012 is ongoing. Attachment A summarizes the planning methodology Reclamation used to develop the Plan. This plan provides an estimated Project water supply to the following areas:

Upper Klamath Lake delivery area: This area generally includes lands in Oregon and California that receive Project water primarily from Upper Klamath Lake (UKL) and/or the Klamath River. This area also includes the Tule Lake and Lower Klamath National Wildlife Refuges.

East Side delivery area: This area generally includes lands within the Langell Valley Irrigation District and Horsefly Irrigation District on the east side of the Project area. This area receives water from Clear Lake Reservoir, Gerber Reservoir and the Lost River.

UPPER KLAMATH LAKE (UKL) DELIVERY AREA:

1. Estimated Inflow to UKL during 2003.

The predicted inflow (in acre-feet) to UKL from April 1 through September 30, 2003, using the NRCS forecast at 50% exceedance, is 290,000 acre-feet for lake elevation operational criteria²; and at 70% exceedance, is 238,000 acre-feet for river flow operational criteria.

2. UKL water year type during 2003.

The initial water year type applicable to Upper Klamath Lake is "DRY" for lake elevation operations planning, subject to changes to actual hydrologic conditions subsequent to April 1. Table 1 shows the four water year types used for lake elevation operations planning:

**TABLE 1
UKL Water Year Types for Lake Elevation Planning**

	Water Year Type			
	Above Average	Below Average	Dry	Critical Dry
UKL Inflow (1000 a-ft)	> 500	500-312	312-185	<185
Occurrence(s) during 10-yr period	1993, 1995, 1996, 1997, 1998, 1999	1990	1991	1992, 1994

¹ U.S. Fish and Wildlife Service and National Marine Fisheries Service Biological Opinions on Klamath Project Operations from June 1, 2002 through March 31, 2012, respectively dated May 31, 2002.

² In accordance with RPA-Element 1 of the FWS May 31, 2002 Biological Opinion (pg. 118).

The initial water year type applicable to the Klamath River is “**DRY**” for river flow operations planning, subject to changes in actual hydrologic conditions subsequent to April 1. Table 2 shows the five water year types for river flow operations planning:

TABLE 2
UKL Water Year Types for River Flow Planning

	Water Year Type				
	Wet	Above Average	Average	Below Average	Dry
UKL Historic Inflow (1000 acre-feet)	> 785.2	785.2-568.6	568.5-458.4	458.3-286.8	< 286.8
Occurrences(s) during 10-yr period	1999	1993, 1996, 1998	1995, 1997	1990	1991, 1992, 1994

3. Lake Elevation and River Flow Operational Criteria for UKL.

Reclamation will operate the Project to ensure that elevations in UKL do not recede lower than the average end-of-month elevations that occurred between October 1, 1989 and September 30, 1999 (the “ten-year” period) for the corresponding water year type³. Table 3 displays these elevations:

TABLE 3
Lake Elevation Operational Criteria for UKL

	Water Year Type			
	Above Average	Below Average	Dry	Critical Dry
March 31	4142.5	4142.7	4141.7	4142.0
April 30	4142.9	4142.8	4142.2	4141.9
May 31	4143.1	4142.7	4142.4	4141.4
June 30	4142.6	4142.1	4141.5	4140.1
July 31	4141.5	4140.7	4140.3	4138.9
August 31	4140.5	4239.6	4139.0	4137.6
September 30	4139.8	4138.9	4138.2	4137.1
October 31	4139.7	4138.8	4138.2	4137.3
November 30	4140.3	4139.0	4139.0	4138.1
December 31	4141.0	4138.8	4139.7	4138.9
January 31	4141.5	4139.5	4140.3	4140.1
February 28	4141.9	4141.7	4140.4	4141.1

Reclamation will operate the Project to ensure that Klamath River flows at Iron Gate Dam (IGD) meet or exceed the operational criteria in Table 4. Table 4 incorporates revisions made to Table 5.9 consistent with the RPA in the final biological opinion⁴.

TABLE 4
Klamath River Operational Criteria for Flows at IGD

	Water Year Type and Flow (cubic feet/second)				
	Wet	Above Average	Average	Below Average	Dry
April 1-15	5932	2955	1863	1826	822
April 16-30	5636	2967	2791	1431	739
May 1-15	3760	2204	2784	1021	676
May 16-31	2486	1529	1466	1043	731
June 1-15	1948	1538	827	959	641

³ U.S. Fish and Wildlife Service. Biological Opinion on Klamath Project Operations from June 1, 2002 through March 31, 2012, dated May 31, 2002. pages 11 and 118.

⁴Source: Table 5.9, February 25, 2002 BA, as modified by conversion to five water year types.

	Water Year Type and Flow (cubic feet/second)				
	Wet	Above Average	Average	Below Average	Dry
June 16-30	1921	934	1163	746	617
July 1-15	1359	710	756	736	516
July 16-31	1314	710	735	724	515
August	1149	1039	1040	979	560
September	1341	1316	1300	1168	731
October	1430	1346	1345	1345	907
November	1822	1414	1337	1324	899
December	1822	1387	1682	1621	916
January	2792	1300	3618	1334	1030
February	4163	1300	1300	1806	673
March 1-15	8018	1953	2143	2190	688
March 16-31	6649	4009	2553	1896	695

The operational criteria include the following down ramping rates at Iron Gate Dam (IGD): (1) decreases in flows of 300 cubic feet per second (CFS) or less per 24-hour period and no more than 125 CFS per four-hour period when IGD flows are above 1,750 CFS; or (2) decreases in flows of 150 CFS or less per 24-hour period and no more than 50 CFS per two-hour period when IGD flows are 1,750 CFS or less.

4. Project Water Bank for 2003.

The Project water bank will be 50,000 acre-feet. During 2003, Reclamation is pursuing reasonable options for securing water to meet the water bank requirement. Table 5 displays the amount of additional flow at Iron Gate Dam resulting from distribution of the water bank (50,000 acre-feet) as determined by NOAA Fisheries:

TABLE 5
Additional flows (CFS) at Iron Gate Dam from the Project Water Bank

Period	"DRY" Water Year Type			
	Klamath River operational criteria*	Additional flow from water bank (CFS)	Total flow (CFS)	Water bank amount (acre-feet)
April 1-15	822	398	1,220	11,841
April 16-30	739	381	1,120	11,336
May 1-15	676	223	899	6,635
May 16-31	731	19	750	603
June 1-15	641	59	700	1,755
June 16-30	617	33	650	970
July 1-15	516	34	550	1,012
July 16-31	515	0	515	0
August 1-15	560	0	560	0
August 16-31	560	190	750	6,030
September 1-30	731	165	896	9,818
Total water bank amount used				50,000

* Source: "Dry" water year type column of Table 4 of 2003 Operations Plan.

5. Estimated Project Water Supply from UKL for Irrigation and Refuges during 2003.

- Water Supply for Irrigation.** The estimated Project water supply expected to be received (assuming a **DRY** water year type) for irrigation from UKL, after deduction of the water bank, from April 1 through September 30, 2003 is **299,000 acre-feet** based upon the hydrological conditions existing on April 1. This amount may increase or decrease in response to hydrological conditions after April 1. The KPFOR Model projects that up to 315,000 acre-feet may be available, however, it should be pointed out that actual conditions may differ widely from those assumed by the model. Project water deliveries after October 15, would be contingent upon

availability of water from UKL and hydrological conditions from October 2003 through March 2004.

- **Water Supply for Refuges.** The estimated amount of Project water from UKL for delivery to national wildlife refuges from April through October 2003, after deduction of the water bank, will be **22,000 acre-feet**. This was estimated in relation to historic deliveries to refuges.

EAST SIDE DELIVERY AREA:

Estimated Project Water Supply for the East Side Delivery Area during 2003.

The estimated Project water supply for irrigation from Gerber Reservoir and Clear Lake from April 1, 2003 through September 30, 2003 is **54,000 acre-feet**. Table 5 displays the projected elevations of Gerber Reservoir and Clear Lake on April 1; the minimum elevations needed to meet the biological requirements of endangered suckers on September 30 (i.e. to provide adequate over-wintering habitat for endangered suckers); and the difference between the April 1 and September 30 reservoir /lake capacities, minus evaporation and seepage. The difference between the reservoir/lake capacity on April 1 and September 30 is the estimated Project water supply for irrigation.

TABLE 5
Estimated Project Water Supply for East Side Delivery Area

	April 1 Elevation	April 1 Capacity (acre-feet)	Sept 30 elevation	Sept 30 Capacity (acre-feet)	Apr 1-Sept 30 evap/seepage (acre-feet)	Net diff. between Apr. 1 and Sept 30 capacities
Gerber Reservoir	4816.7	33,250	4798.1	1,300	1,250 (est)	32,000
Clear Lake	4525.3	113,150	4520.6	41,150	50,000 (est)	22,000
Total amount of project water available for East Side delivery area						54,000

OTHER INFORMATION RELEVANT TO 2003 OPERATIONS PLAN:

Comparison of Estimated Water Supply to Historic Delivery.

This is provided for information purposes only and uses a “DRY” water year type for the UKL delivery area (5 WYT) and a “DRY” water year types for the East Side delivery area (4 WYT). Table 6 compares the 2003 estimated Project water supply for irrigation and refuges to historical deliveries from 1961 to 2002.

TABLE 6
Comparison of Estimated 2003 Project Water Supply to Historic Deliveries

	2003 Estimated Supply (1000 acre-feet)	Historic Delivery (1961-2002) During Dry Water Year Types (1000 acre-feet)
UKL Delivery Area (irrigation)	299.0*	Ave = 322.7 (299.0 to 344.8)
National Wildlife Refuges (refuges)	22.0*	Ave = 41.9 (25.5 to 63.2)
East Side Delivery Area (irrigation)	54.0	Ave = 68.6 (46.4 to 84.9)

* Available supply after the water bank has been subtracted (50,000 acre-feet from the irrigation supply and 3,500 acre-feet from the refuge supply). This is an estimate of the water supply and is subject to change if hydrological conditions change after April 1. The actual amount provided may be greater or less than this estimate.

ATTACHMENT A

General Description of 2003 Operations Planning Process

The 2003 operations plan was developed in accordance with the 2002 Service and NOAA Fisheries biological opinions. The information in the plan is developed as follows:

For the Upper Klamath Lake (UKL) Delivery Area:

1. Estimate Inflows to UKL.

Reclamation estimates the inflow (in acre-feet) using the NRCS's forecast beginning in early January (for information purposes) and revises the inflow predictions in early February and March. The estimate of predicted inflows uses the 50% exceedance for UKL for lake elevation planning considerations⁵ and a 70% exceedance for UKL river flow planning considerations

2. Determine Water Year Type for 2003.

UKL water year types for Project operations planning purposes are defined by historic actual inflow. The methodology used to define the water year type parameters was explained in the *Klamath Project 1998 Operations Plan Environmental Assessment*⁶. For UKL, water year type is defined by the forecast inflow between April 1 and September 30 annually. In early April (usually on or after April 10), Reclamation will determine the water year type most likely to occur from April through September. As a result of ESA consultation, two sets of water year types have been defined for purposes of annual operations planning⁷. For lake elevation planning, Reclamation will use four water year types: above average, below average, dry and critical dry. For river flow planning, Reclamation will use five water year types: wet, above average, average, below average and dry. Reclamation will continue to monitor the NRCS forecasts in May and June. After June, actual inflow to UKL will be regularly monitored. The continued monitoring of predicted and actual inflows will allow Reclamation to adapt Project operation to respond to the actual water year type if precipitation and hydrological conditions after April 1 vary significantly from conditions prior to April 1. The water year type can, and will, be changed to either wetter or drier year types after April 1, if necessary, in response to actual hydrologic conditions.

3. Lake Elevation and River Flow Operational Criteria for 2003.

Water deliveries for irrigation from UKL will be provided within the operations regime observed from water year 1990 through water year 1999 (ten-year period) consistent with the findings of the National Research Council's Interim Report of February 2002. The observed values for the lake levels and river flows that occurred during the ten-year period were used as criteria to determine the Project's irrigation and refuge deliveries in Reclamation's biological assessment (BA). The operational criteria for river flows have been revised to be consistent with the reasonable and prudent alternative (RPA) in NOAA Fisheries 2002 biological opinion. That biological opinion specifies that during Phase I (2002-2005) Reclamation will operate the Project to meet or exceed the Klamath River flows at Iron Gate Dam described in Table 5.9 of the biological assessment (as modified by conversion to five water year types) plus the additional volume of water to be provided by the water bank⁸. It also states that the flows would be modified on an annual basis by agreed upon use of the water bank for improved spring flows and/or summer flows and that by March 31 of each year, NMFS and Reclamation will determine how this additional water will be distributed for release.

4. Quantify the Project Water Bank Requirements for 2003.

⁵ In accordance with RPA-Element 1 of the FWS May 31, 2002 Biological Opinion (pg. 118).

⁶ Klamath Project 1998 Annual Operations Plan Environmental Assessment. Pgs. 14-15.

⁷ U.S. Fish and Wildlife Service and National Marine Fisheries Service Biological Opinions on Klamath Project Operations from June 1, 2002 through March 31, 2012, respectively dated May 31, 2002.

⁸ National Marine Fisheries Service. Biological Opinion on Klamath Project Operations from June 1, 2002 through March 31, 2012, dated May 31, 2002. pages 55-56.

Reclamation's 2002 BA proposed establishment and use of a "water bank" and that the size of the water bank would be determined using criteria set out in the 2002 BA. However, as a result of ESA consultation, the Service and NOAA Fisheries established the water bank size for 2003 at 50,000 acre-feet in the 2002 biological opinions (page 11 and page 56 in the respective opinions). The water bank size has been determined and does not require the 2002 BA calculation. Reclamation has agreed to operate the Project during 2003 consistent with the 2002 biological opinions⁹. The water bank will be deducted from the Project water supply available for irrigation.

During 2003, Reclamation will pursue reasonable options for securing water to meet the water bank requirement. Reclamation believes that several sources of water, including regulatory storage, irrigation demand reduction and groundwater may be feasible for the water bank. Demand reduction includes both irrigation demand reduction and refuge demand reduction. Irrigation demand reduction involves farmers voluntarily idling their lands in return for compensation. Groundwater or conjunctive use involves using pumped groundwater from wells to supplement surface water supplies. There may be additional shortages to irrigation and refuge deliveries due to hydrological conditions after the water bank is deducted from the Project water supply. Agricultural users would not be compensated for these additional shortages that result from unanticipated hydrologic conditions.

5. Estimate Project Water Supply for Irrigation and Refuges for 2003.

Reclamation estimated the Project water supply for irrigation and refuges available from UKL by:

- First, estimating inflow from April 1 through September 30, 2003.
- Second, determining the applicable water year type for 2003.
- Quantifying the applicable water bank amount for 2003.
- Third, determining the minimum amount of water for agriculture based on the year type:
- Then, using the elevation/flow operational criteria for the applicable water year type.
- Estimating the available Project water supply, after deducting the water bank amount, using the KPOPFOR forecasting model that may be available, keeping in mind that actual conditions may differ a great deal from the Model.

6. Refuge Water Supply.

Project water has historically been delivered to Tule Lake and Lower Klamath National Wildlife Refuges during Project operation (see Table 7) for maintaining seasonal and permanent refuge wetlands.

Reclamation considered historic refuge deliveries to assist with 2003 operations planning. The Service provided information related to refuge management and operation during various water year types. The refuges receive water year-round, not just during April-September. October-March water deliveries are important to the refuge and affect overall Project operation. Reclamation may be required to adjust refuge Project water deliveries to meet the 2002 biological opinion requirements and irrigation deliveries, when necessary.

Reclamation stated in its 2002 biological assessment (BA) that national wildlife refuges, including Tule Lake, Lower Klamath, Upper Klamath Lake and Clear Lake National Wildlife Refuges, are under the jurisdiction of the U.S. Fish and Wildlife Service (Service) and their operation is subject to the Service's management and control¹⁰. The BA described only those effects upon the refuges that resulted from operation of the Klamath Project and not the effects of refuge operation. During 2003, Reclamation will operate the Project consistent with the requirements of the 2002 biological opinions (BO), including establishment/use of a water bank, and provide adequate water to Lower Klamath and Tule Lake National Wildlife Refuges, when in priority and when water is available.¹¹ This requires consideration of refuge

⁹ Letter from Reclamation's Mid-Pacific Regional Director to the Service and NOAA fisheries dated January 2, 2003.

¹⁰ Biological Assessment. The Effects of Proposed Actions Related to Klamath Project Operation (April 1, 2002-March 31, 2012) on Federally-listed Threatened and Endangered Species, dated February 25, 2002. pages 13-14.

¹¹ Pacific Southwest Regional Solicitor's Memorandum, dated July 25, 1995, regarding certain legal rights and obligations related to the Bureau of Reclamation.

water deliveries as part of the 2003 operations plan because those deliveries contribute to Reclamation's ability to meet the BO requirements and its legal obligations.

Reclamation's compliance with the BOs requires a water bank which involves acquiring water from all components of the Project, including refuges. The water bank amount has been established for 2003 (i.e. 50,000 acre-feet). The extent that the irrigation and refuge components of the Project provide water for the water bank will be based upon their Project water use. This means that when Project irrigators are required to reduce a portion of their Project water use through demand reduction, then Project water deliveries to refuges would be reduced by a similar proportion. Should additional requirements for Project water develop then Project water deliveries to refuges could be further reduced. If additional hydrologic shortages occur, refuge deliveries could be completely curtailed.

7. Other Information Relevant to the Operations Plan.

Reclamation considered other information relevant to the operations plan that could influence the UKL Project water supply for irrigation and refuges, such as:

- Comparing the estimated 2003 Project water supply for the UKL delivery area to historic UKL irrigation and refuge deliveries; and comparing the estimated 2003 Project water supply for the East Side delivery area to historic East Side irrigation deliveries. The comparison of estimated supplies to historic deliveries serves to inform both Reclamation and Project water users of potential needs for additional demand reduction/supply enhancement measures. Reclamation may investigate and implement measures to either further reduce demand or enhance supply as a result of the comparison. Such measures would be in addition those implemented to establish the water bank.
- Reclamation considered the effects of pre-season fall/winter irrigation of agricultural and refuge lands in the UKL delivery area. This pre-irrigation could, during drier hydrologic conditions, affect Reclamation's ability to meet the UKL operational criteria for endangered suckers by reducing the amount of water storage in the lake. If such a circumstance were to arise, then Project operation could be modified in response to pre-season irrigation and/or the available supply for pre-irrigation could be reduced. This condition did not occur prior to April 1, 2003.
- Precipitation in Klamath Falls, Oregon during February and March. Precipitation during this period establishes the agricultural demand index when the irrigation season starts in early April. This index is integrated into operation planning model used to predict the Project water supply.

For the East Side Delivery Area:

Estimated Project Water Supply for the East Side Delivery Area during 2003.

Reclamation will operate the Project reservoirs that serve the East Side delivery area (Gerber Reservoir and Clear Lake) consistent with the 2002 BOs, as amended to clarify application of the operational criteria for endangered suckers¹². This operation ensures that reservoir/lake elevations do not recede lower than the minimum elevations needed to protect endangered suckers on September 30, i.e. elevations 4798.1 for Gerber Reservoir and 4520.6 for Clear Lake. Reclamation estimated the Project water supply for irrigation by: (1) determining the April 1 reservoir/lake volume (assuming that the April 1 elevation is no less than the minimum required elevation to protect endangered suckers); (2) adding any inflows and subtracting evaporation/leakage between April 1 and September 30; and (3) subtracting the September 30 reservoir/lake volume at the minimum required elevations to protect endangered suckers.

¹² U.S. Fish and Wildlife Service. Amendment to 2002 Biological Opinion on the Effects of the 10-Year Operation Plan for the Klamath P (FWS#1-10-02-F-121), as it Relates to Operation of Clear Lake and Gerber Reservoir. March 4, 2003.